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COSMIC ON AIR: A CITIZEN SCIENCE APPROACH TO HUNTING SOLAR ERUPTIVE PHENOMENA AT FLIGHT ALTITUDES

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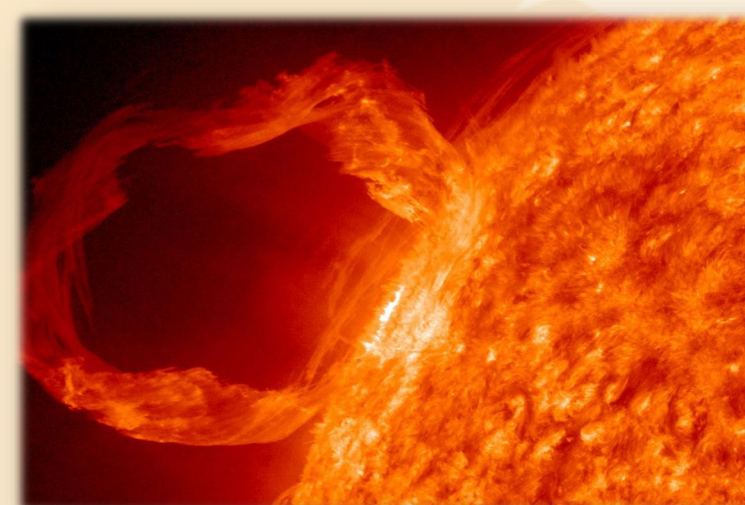
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Cosmic On Air is a citizen science project which aims to increase coverage of measurements of cosmic radiation on board aircraft in the search of solar eruptive phenomena. A number of low-cost, compact, and connected radiation monitors are available to the public for purchase, and the data measured during flights are uploaded to an open data repository for analysis.



Dosimetry of aircrew is routinely achieved using numerical approaches validated by measurements made on board aircraft. However, in cases of randomly occurring solar eruptive phenomena, which can produce a burst of sufficiently energetic Solar Particle Events to be classified as a Ground Level Event (GLE), the dose rates at flight altitudes can be significantly increased. Current dosimetry models for GLEs cannot be easily validated due to the very few on-board measurements during such phenomena.

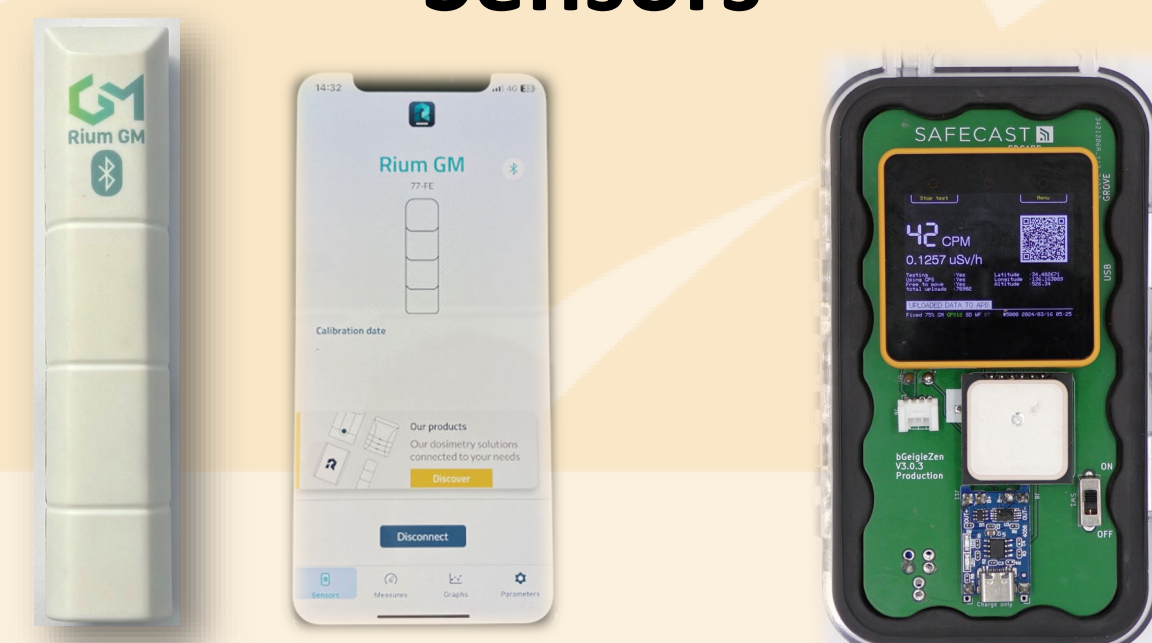
Participate in this project

- Get a sensor.
- Fly on a plane and measure!
- Upload your data on our website for science.
- Analyse your data with our Python tools (great for high school, college and university projects).
- Be a co-author on the scientific paper with the first measurement of a solar flare.

Present developments

- Upgrades to the Rium detector and phone app.
- Analysis tools for both Safecast and Rium detectors.
- Educational materials for school and college projects.
- New compact detector for neutron radiation.

Sensors



Rium GM

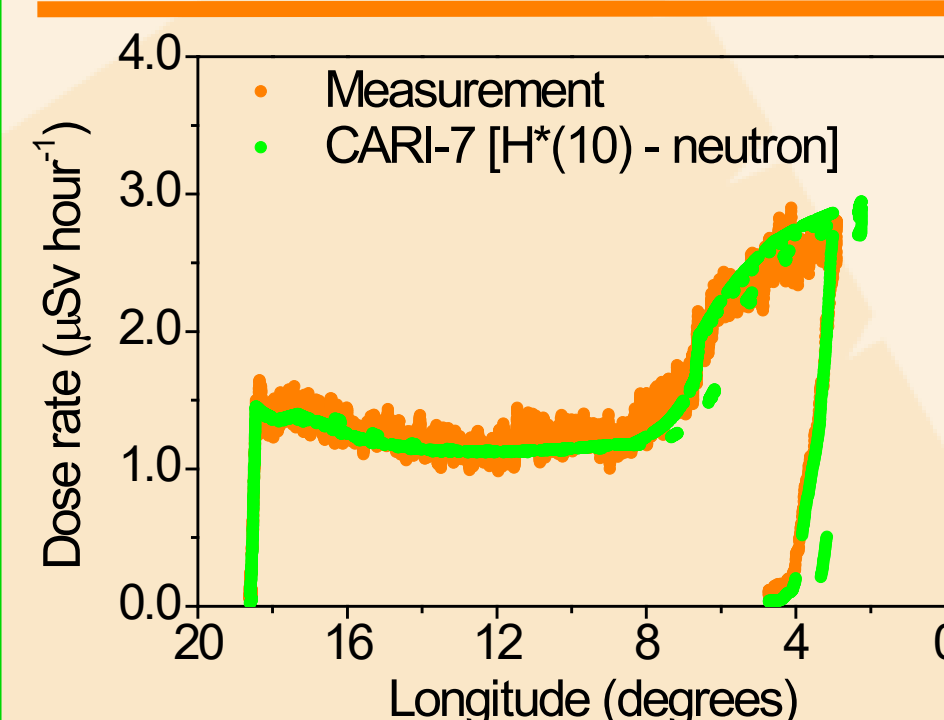
(presently being upgraded)
www.cosmic-on-air.org
GM tube; compact;
bluetooth to phone app

bGeigieZen

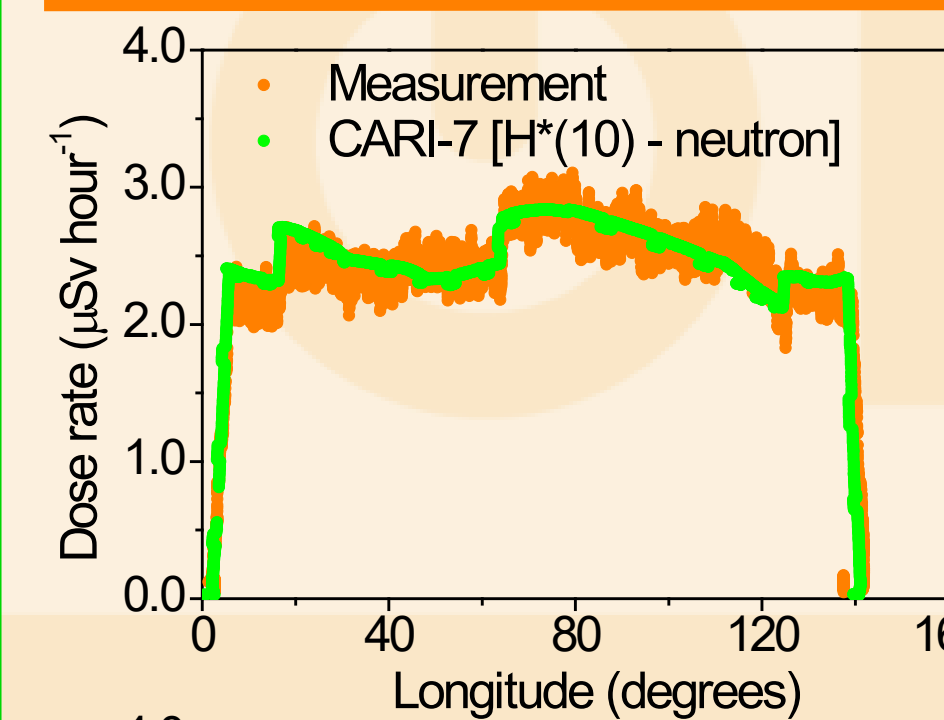
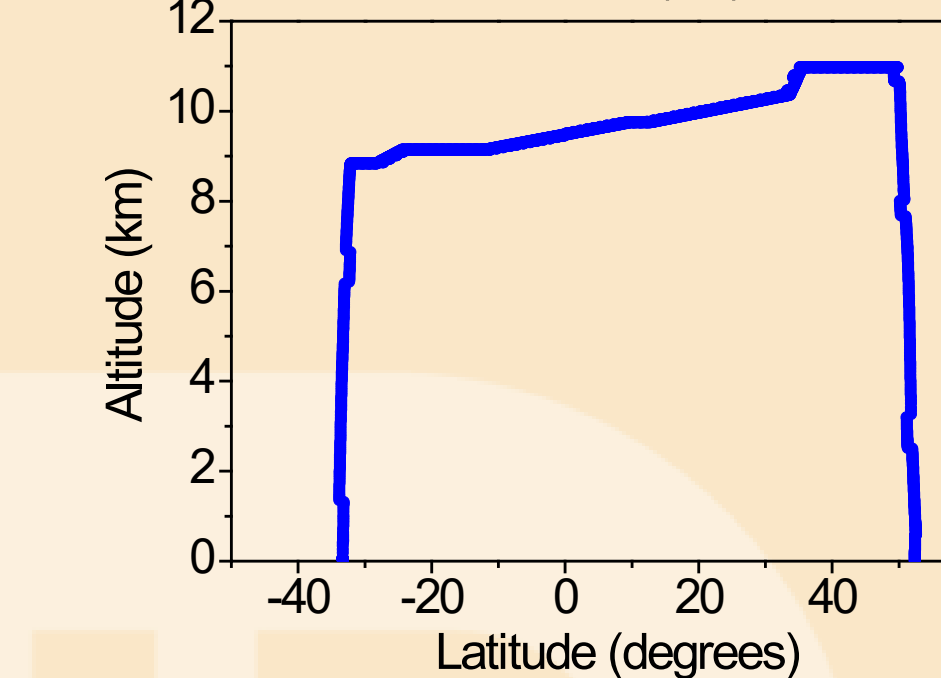
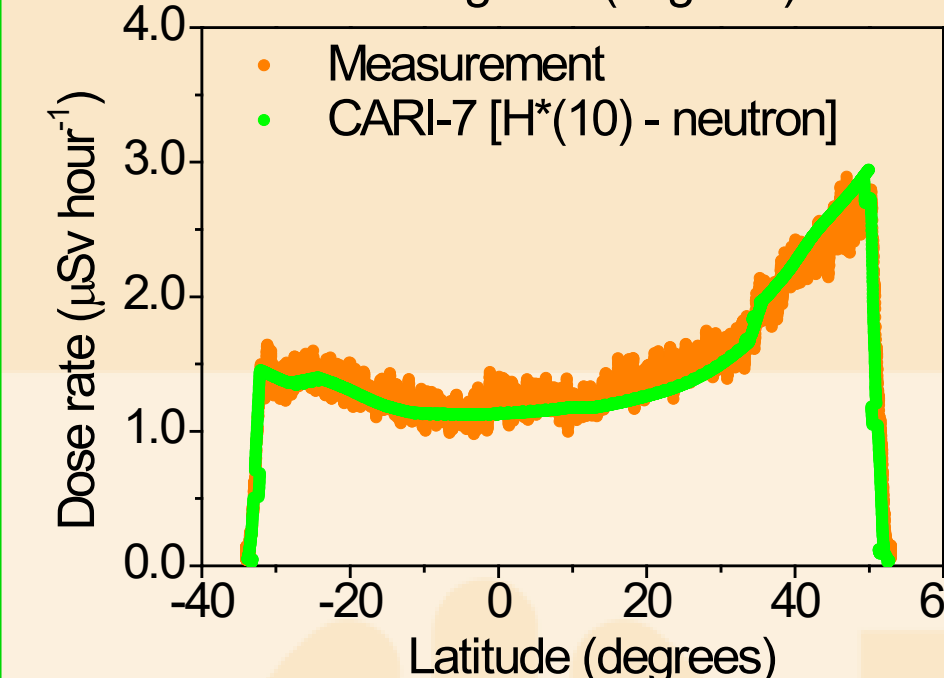
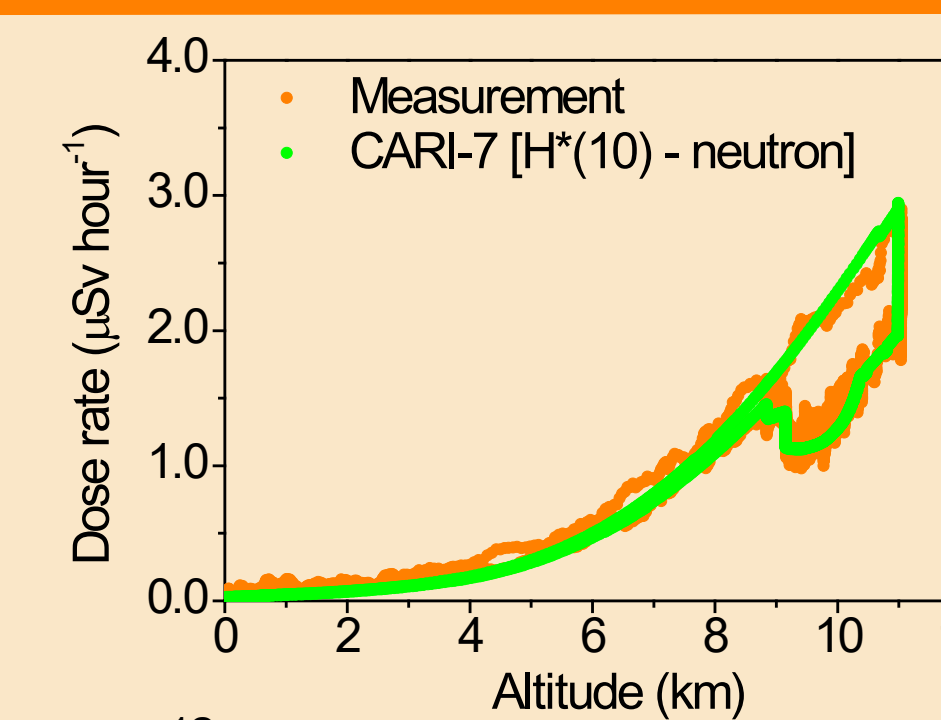
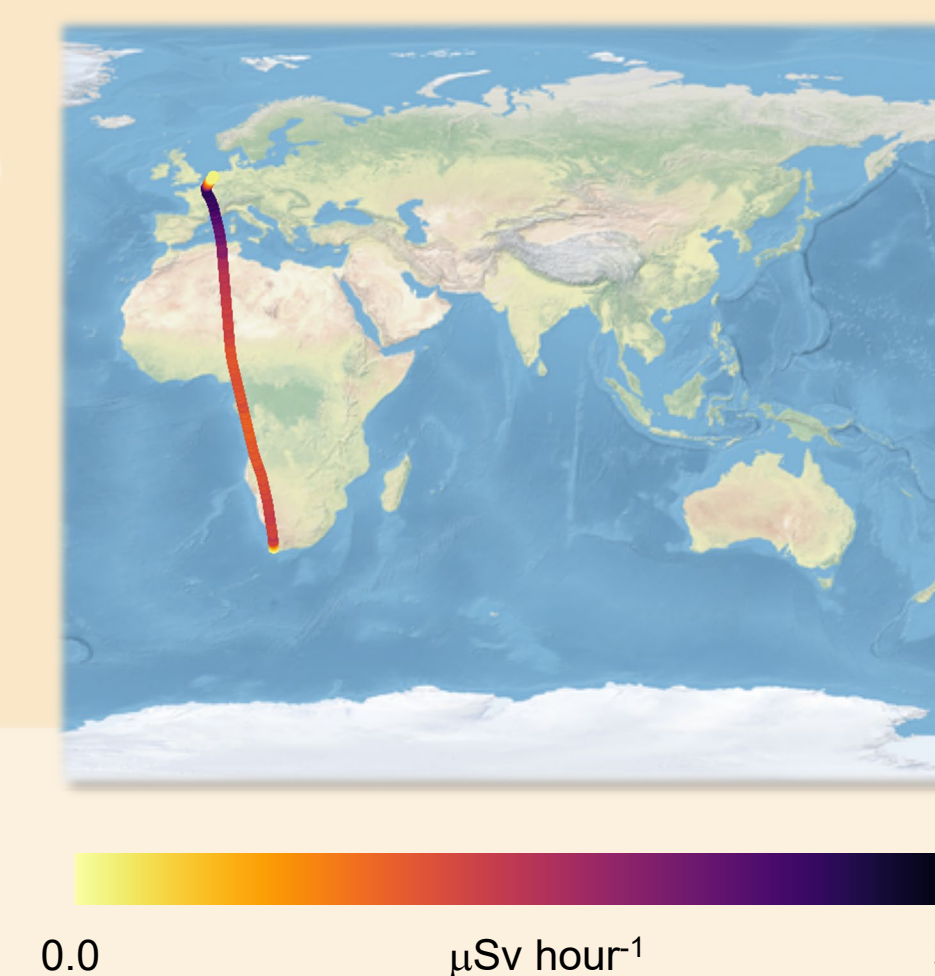
www.safecast.org
Pancake GM; GPS;
microSD card

Recent measurements

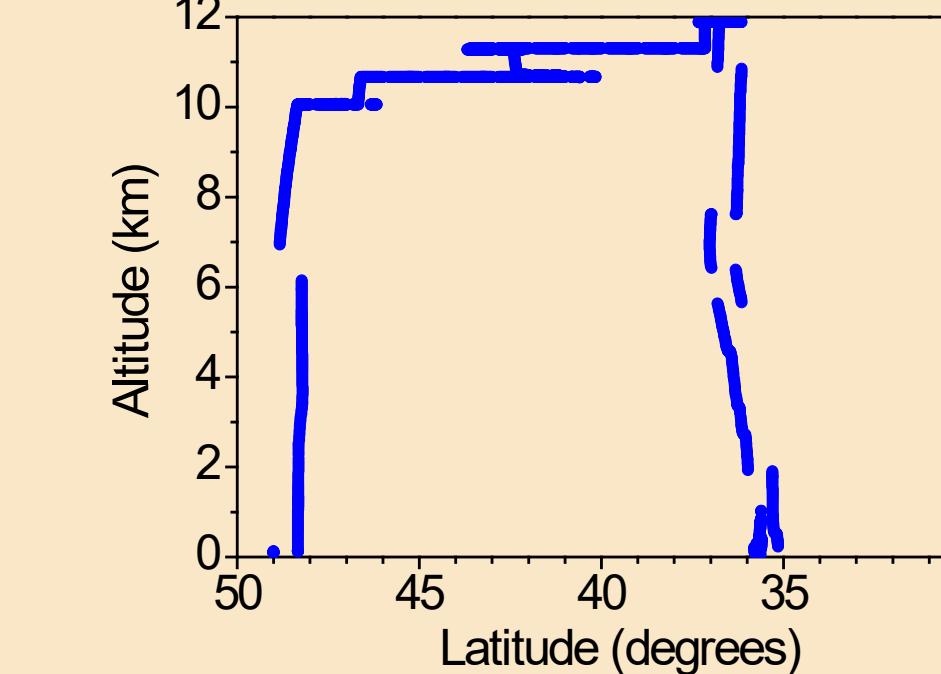
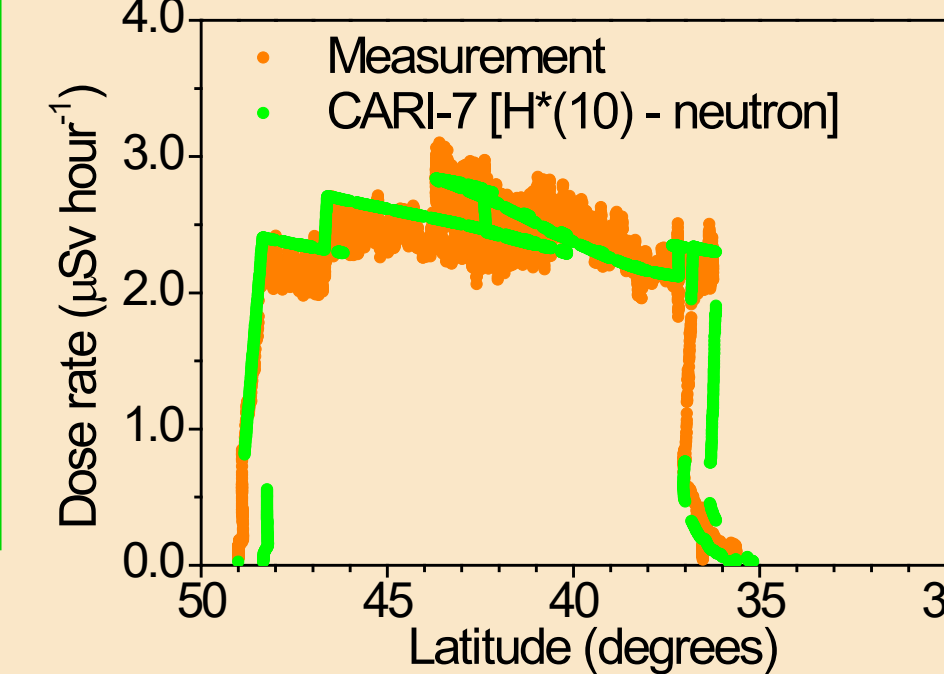
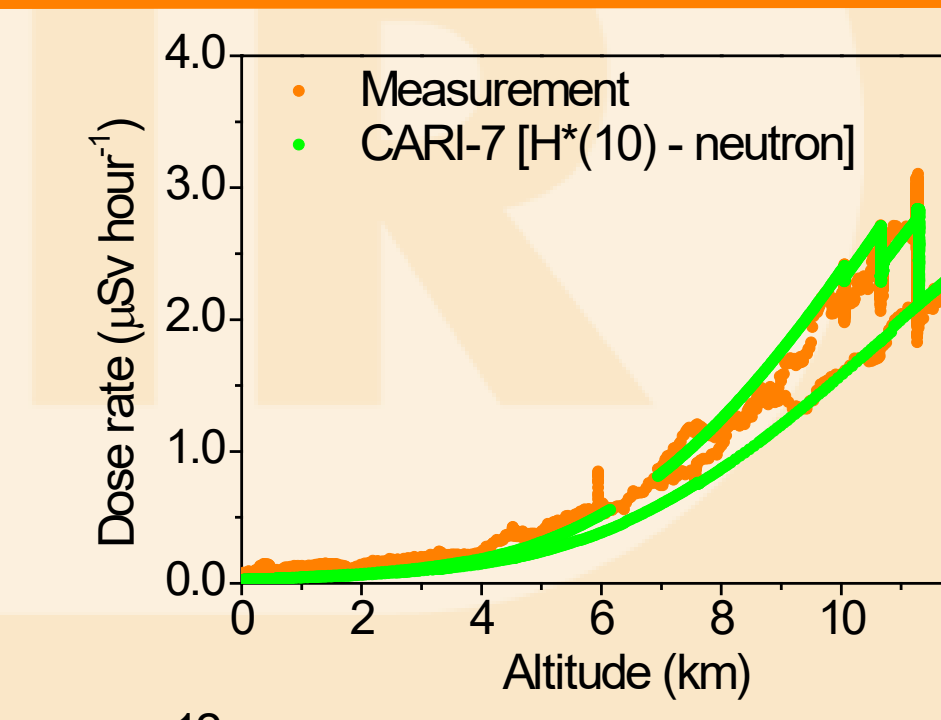
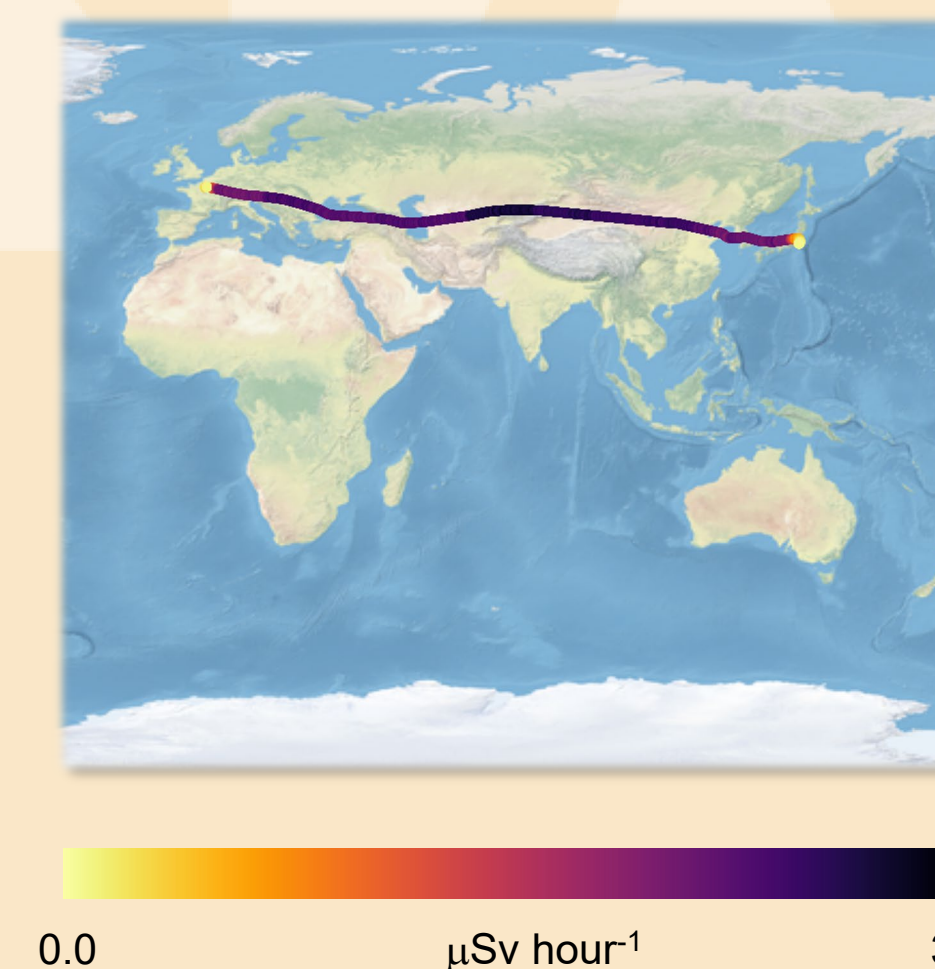
- Measurements made on two flights are shown, blended with flight data from FlightAware.
- Calibration coefficients for dose rate have been derived for these sensors using in-flight measurements with reference detectors (e.g. Hawk TEPC).
- CARI-7 is a code developed by the Federal Aviation Administration to calculate the dose ($H^*(10)$) as a function of radiation type, geographic location, altitude, and known fluctuations in solar activity.
- Since the current sensors are insensitive to neutron radiation, the neutron contribution is subtracted from the total dose before comparison with measurement.



Cape Town to Amsterdam
KL0598
12 June 2024



Paris to Tokyo
AF0146
28 November 2023



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